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Experience with laparoscopy for the evaluation of cholestasis in newborns*

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Summary. In many children with cholestasis, ultrasonography can rule out the possibility of biliary atresia. In the few cases when a diagnosis cannot be established by ultrasonography, laparoscopy is still justified as an initial procedure, as the amount of trauma involved is still minimal. Of the 36 children with cholestasis on which a laparoscopy was performed, one-third eventually underwent laparotomy because of biliary atresia. The question was whether the primary laparoscopy was really advantageous. In comparison to laparotomy no advantages were found with regard to anesthesia time; morbidity, or complications. The diagnostic accuracy was comparable to that of laparotomy. The only complication was a small scar hernia in a premature baby.

Key words: Laparoscopy – Peritoneoscopy – Biliary atresia

Neonatal cholestasis needs to be evaluated up to the 6th week of life. Thereafter, the prognosis of the children operated on worsens steadily [4]. Statistically, the two main diseases that must be differentiated are biliary atresia and hepatitis: biliary atresia must be operated on; hepatitis must not [1]. If ultrasonography demonstrates the presence of a normal gallbladder or a fully patent extrahepatic biliary system, biliary atresia is unlikely. With persistent cholestasis and the patency of the extrahepatic biliary system in doubt, however, only laparoscopy or laparotomy can clarify the diagnosis further. The question is therefore whether in these cases laparoscopy is sufficient to make the diagnosis or would immediate laparotomy be preferable.

Technique

Under general anesthesia, a Storz laparoscopy set is used together with a Wiest KG Laparoflator and a normal light source. Air is blown into a puncture to the left of the umbilicus with a maximum pressure of 20 mmHg. Just to the right of the umbilicus, the guide tube is inserted and replaced by the optic for an initial orientation. In differentiating between biliary atresia and hepatitis, the main areas of interest are the entire liver, the gallbladder (which might be hypoplastic or absent) and the hepatoduodenal ligament, specifically the extrahepatic bile ducts. Biopsy specimens from selected areas and a cholangiography conclude the intervention. Biopsies and cholangiographies are performed through a separate small stab incision through the 6th intercostal space on the right. Thus, the gallbladder is approached through the liver parenchyma. The advantages in this technique are that there is greater mechanical control and bile leaks are prevented. If the intra-abdominal air pressure is too high, the flow of contrast medium from the gallbladder to the hepatic and common duct could be impaired. In most cases, reduction of intra-abdominal pressure or compression of the common duct with the laparoscope will clarify the situation.

Results

In the last 4 years, we have performed 36 laparoscopies on babies. Their weight ranged from 1850 to 5600 g, with a mean of 3200 g. The preoperative diagnosis was cholestasis. Ultrasonography was unable to confirm the existence of a normal gallbladder or its patency and relationship to other segments of the extrahepatic biliary system. Twelve of the children were finally diagnosed as having biliary atresia. In these cases, we performed an additional laparotomy and a hepatoportoenterostomy during the same procedure. In the remaining two-thirds of our patients, a diagnosis which did not require surgery was either definitively established or at least strongly supported by laparoscopy and biopsy.

The total anesthesia time required for setting up instruments and for performing biopsies and cholangiography was equal to that of a routine explorative laparotomy. One minor complication was noted: a small scar hernia in a newborn, which later closed spontaneously without surgical intervention.

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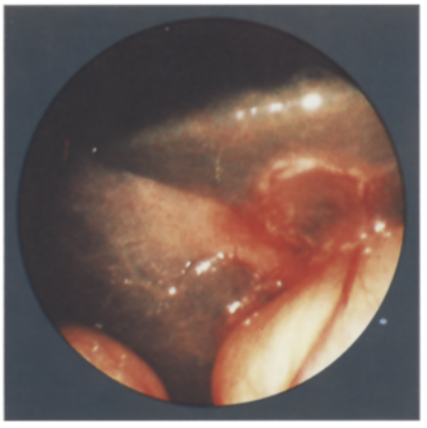

Fig. 1. Biliary atresia: 5th week of life. Anterior margin of the left liver lobe with cholestasis and fibrosis

Discussion

If ultrasonography is unable to demonstrate a gallbladder, one could assume biliary atresia and proceed straight to laparotomy. If scintigraphy [2] and ultrasonography produce doubtful results and cholestasis and the clinical impression of biliary atresia persist, laparoscopy is indicated. One-third of the patients suspected of having biliary atresia were eventually found to have it. Other investigators have reported a similar ratio [5]. If a gallbladder is found during laparoscopy and extrahepatic bile ducts can either be visualized directly or by cholangiography, biliary atresia is ruled out and the procedure terminated. In all other cases, a laparotomy is required.

The technical modifications as described by other authors [3, 5] concern the localization of the umbilical insertion of the trocar or an additional stab incision (halfway between the umbilicus and the anterior superior iliac spine versus the 6th intercostal space). To penetrate the immediate umbilical area in a premature baby can greatly complicate the maintenance of the intra-abdominal pressure. Insertion of the trocar laterally from the umbilicus could injure the epigastric vessels or create a small hernia, a complication that did, in fact, occur in one of our patients.

We did not find any difference in anesthesia time or morbidity as compared to laparotomy. While laparoscopy is a surgical procedure in itself, it is less traumatic. Certainly, during laparotomy the organs in question are better exposed, and it would seem that it offers a better evaluation. However, the view obtained by laparoscopy is fully sufficient for a comprehensive investigation.

Biopsies can also be taken at the exact site chosen, and the bleeding that regularly occurs can be controlled. Finally, if in fact laparoscopy were the only procedure required and no surgery needed to be performed, the visual impression obtained could still add to the clinical picture and adequately support histopathological investigations. Limiting technical factors attributed to the smaller dimensions (less brightness due to smaller diameters, shorter and smaller working distances and angles, impaired view by floating greater omentum) are evident, but if they are kept in mind, laparoscopy can be safely performed in small infants. In the evaluation of cholestasis, it helps to avoid unnecessary laparotomies and its diagnostic accuracy is equal to that of laparotomy.

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